Comparison of Educational Preferences of Polish and Ukrainian Students at Lectures

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Abstract This study continues the extensive and painstaking work in the research of educational services at Universities in Eastern Europe. The purpose of the study is to compare educational preferences of Polish and Ukrainian students at lectures. The study was carried out by authors since December 2018 till June 2020. There were 741 respondents in the study. The following research methods were used in the work: theoretical (specification and generalization; comparative and retrospective analysis; induction and deduction; classification); empirical (study scientific articles and content analysis of scientific sources); social statistics (planning of experiments, grouping of results, primary processing and verification of statistical hypotheses). The results obtained are of scientific and practical significance: 1. It was shown that students of both countries prefer visual teaching methods at lectures. 2. It has been proven that the educational preferences of Polish and Ukrainian students at lectures are not equal. Polish student preferences related the visual teaching methods at lectures are higher than Ukrainian ones. 3. Authorities Polish Universities should take into account the difference of Polish and Ukrainian student preferences in order to start selling educational services in Ukraine. The results are highly statistically significant (0,01).

Keywords Educational Preferences, Educational Services, Lecture, Visual Teaching Method, Auditory Teaching Method

1. Introduction

This study is an important part of a General research of higher educational services in East European Universities. The study was carried out at Wroclaw University of Environmental and Life Sciences, the Volodymyr Dahl East Ukrainian National University, Luhansk Taras Shevchenko National University and the M. Ostrohradskyi Kremenchuk National University. The General research was initiated in December 2016 by the East European Scientific Group. And this study was started by authors in December 2018 and finished in June 2020.

2. Literature Review

The literary review cover above 100 scientific sources, including those published in the journals: Societies and Education; Higher Education; Higher Education in Europe; Higher Education Pedagogies; Higher Education Quarterly; International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies; International Journal of Education and Practice; Journal of Higher Education Policy and Management; Journal of Marketing for Higher Education; Research in Higher Education; Studies in Higher Education; Universal Journal of Educational Research, etc. The articles informed us, that the topic of the higher educational services was in demand about 40-50 years ago. The articles, that were the closest to this topic were selected for a scrupulous analysis. For example, [1-14].

The literary review has included above 10 papers in journals indexed in databases SCOPUS and Web of Science.

The article [1] raises the question of the attitude to the student as a consumer of educational services. The authors of articles [2, 3] consider the General characteristics of the global and Eastern European educational services markets.

The articles [4-7] carefully examine the features of visual and auditory teaching methods.

General questions of "free education" and the degree of satisfaction of students with the quality of educational services and education are studied in research [8-12].

Finally, articles [13, 14] present the results of research on the preferences of Ukrainian and Polish students regarding visual and auditory teaching methods at lectures. These articles describe students of legal, pedagogical, and medical specialties.

In this article, a large-scale study is performed. Here they are compared educational preferences of Polish and Ukrainian students at lectures. In General, in this study, the authors interviewed more than 700 respondents of various specialties and forms of education.

3. Methods

The study was carried out at the East European Scientific Group, the Volodymyr Dahl East Ukrainian National University, Luhansk Taras Shevchenko National University and the M. Ostrohradskyi Kremenchuk National University since December 2018 till June 2020. The experiential part of the study was focused on Polish and Ukrainian territory. There were 741 respondents in total.

Related to theoretical part, the authors relied on previous articles published before that.

The object of the study is higher educational services.

The subject of the study is preferences of students at lectures.

The purpose of this study is to compare educational preferences of Polish and Ukrainian students at lectures.

The authors used the following research methods:

- theoretical (specification and generalization; comparative and retrospective analysis; induction and deduction; classification);

- empirical (study scientific articles and content analysis of scientific sources);

- social statistics (planning of experiments, grouping of results, primary processing and verification of statistical hypotheses).

At the first step, the plan of the ascertaining experiments was created. The General basics of building an experiment plan are described in detail in work [5].

The plan of the ascertaining experiment included a comparison of student preferences in Poland and Ukraine. This was used serial (nested) sampling [15] for the experiment. In the study, the series of units of the population were selected randomly. The study involved respondents from Poland and Ukraine.

The characteristics of the respondents, after rejection of substandard questionnaires, are given in Appendix 1. The Appendix 1 shows that the study surveyed 741 respondents.

The verification of statistical hypotheses was performed in accordance with the recommendations set forth in the statistical textbooks [16, 17]. It was estimated the difference between two mathematical expectations [18]. The statistics, which form the basis of the criterion for testing the equality of the mathematical expectations of two general totalities, are based on the difference between the sample averages $\dot{X}_1 - \dot{X}_2$. To estimating the differences between two mathematical expectations, it was used a formula,

$$Z = [(\dot{X}_1 - \dot{X}_2) - (\mu_1 - \mu_2)] / \sqrt{(\dot{S}_1^2 - \dot{S}_2^2)} \qquad (1),$$

where $\dot{X}_1$ - expected value of the first general totality,

μ_1 - mathematical expectation of the first general totality,

$\dot{S}_1$ - average sample error taken from the first general totality,

$\dot{X}_2$ - expected value of the second general totality,

μ_2 - mathematical expectation of the second general totality,

$\dot{S}_2$ - average sample error taken from the second general totality.

The Research hypothesis is H_0: $\mu_1 - \mu_2 = 0,0$. The Research hypothesis: there are no significant differences between two independent samples, if one does not take into account random deviations.

The Alternative hypothesis is H_1: $\mu_1 - \mu_2 \neq 0,0$. The Alternative hypothesis: there are significant differences between two independent samples, if one does not take into account random deviations.

For the standard significance level of 99,0% (p = 0,01), $z_{tabl} = 2,58$ [18]. Verification of statistical hypotheses made it possible to transform the subjective opinions of 741 respondents into strong scientific results.

And, at last, after discussion, the authors made a conclusion.

4. Results

The study covered respondents from Poland and Ukraine. The characteristics of the respondents, after rejection of substandard questionnaires, are included in Appendix 1. The Appendix 1 shows that the study surveyed 741 respondents. There were undergraduate and graduate students, full-time and part-time students, Humanities, Natural Sciences and Engineering students.

4.1. Primary processing and grouping of the results

The questionnaire for interviewing students is in the article [5].

The main question of the registration form was: What method of learning do I prefer at lectures?

Three possible answers were provided:

1. The teacher has a presentation, and I write from slides.

2. The teacher dictates, and I write the lecture.

3. The teacher tells, and I note.

The answer No 1 relates to the visual teaching methods at the lectures. The answers No. 2 and No. 3 relate to the auditory teaching methods at the lectures. Characteristics of the respondents' answers is in Appendix 2. The first column shows the group number according to Appendix 1.

The Appendix 2 shows the total results of the initial assessment of respondents' preferences when they receive information at the lectures.

Figure 1 and Figure 2 show the comparison common results for Polish and Ukrainian students. In total there are 741 respondents.

As shown in Figures 1 and 2, students in both countries prefer the visual teaching methods at lectures. Of the polled Polish students, 88% chose the visual teaching methods. In Ukraine, this number was less. Only 69% of Ukrainian students preferred the visual teaching methods. In any case, this is more than half of the students. The experimental results obtained are confirmed by previously published data [13, 14].
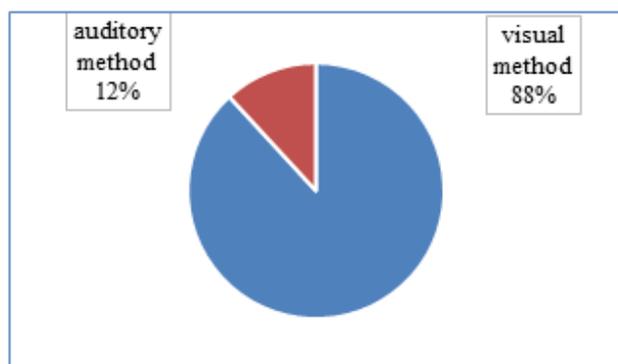
Figure 1. The preferences of Polish students related to teaching methods at lectures
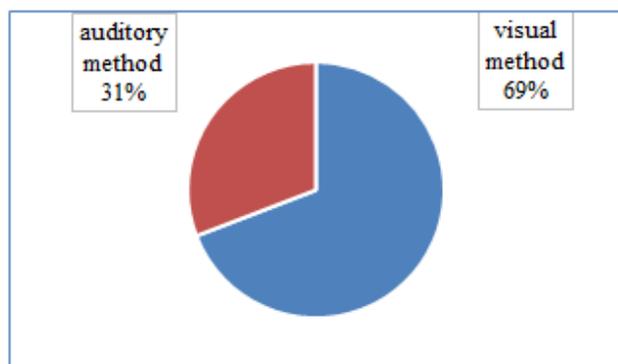
Figure 2. The preferences of Ukrainian students related to teaching methods at lectures

Unfortunately, the graphical method does not allow performing a reliable comparison in two independent samples. Therefore, we cannot make a comparison of preferences of Polish and Ukrainian students. You can compare two samples using statistical hypothesis verification.

Verification of statistical hypotheses can provide reliable, scientifically based answer to the question: are educational preferences of Polish and Ukrainian students at lectures equal. Verification of statistical hypotheses allow to get new scientific knowledge about student preferences in Poland and Ukraine.

Let's transform the nonparametric data from the Appendix 2 into a formal form [15]. For the determining the average values and the variation of the characteristics, the value "0" was assigned to the auditory method of learning. The answers No. 2 and No. 3 relate to the auditory teaching methods at the lectures. So, they were combined before the calculation. The value "1" was assigned to the visual teaching methods. These methods relate to the answer No 1. Further, the authors presented the data into a new formal form. So, it was drawn up two samples for the statistical comparison of the Polish and Ukrainian student preferences at lectures. Thus, it was calculated new statistical indicators (Table 1).

Table 1. Student preferences related teaching method at lectures in Poland and Ukraine

№	Country	Statistical indicators			
		n	$\dot{X}$	δ_x	δ_{x-1}
1	Poland	355	0,88	0,32	0,32
2	Ukraine	386	0,69	0,46	0,46

In Table 1, line 1 shows data for a sample of educational preferences of Polish students. In Table 1, line 2 shows data for a sample of educational preferences of Ukrainian students. There is a difference of students' preferences in the visual teaching method at lectures. Statistical indicators of Table 1 allow to check statistical hypotheses and compare student preferences at lectures for students of both countries.

4.2. Verification of Statistical Hypotheses

Fig. 1 and Fig. 2, and Table 1 clearly show that student preferences in Poland and Ukraine are different. Is this difference significant or is it the result of random deviations? In other words, it should be found the answer to the question: are educational preferences of Polish and Ukrainian students at lectures equal? So, it will be estimated the difference between two mathematical expectations at a confidence level of 99,0 [18]. On this stage of verification of statistical hypotheses, a Research hypothesis and an Alternative hypothesis were considered.

The Research hypothesis is H_0: $\mu_1 - \mu_2 = 0,0$. The Research hypothesis asserts that there are no significant differences of student preferences in both countries, Poland and Ukraine, if one does not take into account random deviations.

The Alternative hypothesis is H_1: $\mu_1 - \mu_2 \neq 0,0$. The Alternative hypothesis asserts that there are significant

differences of student preferences in both countries, Poland and Ukraine, if one does not take into account random deviations.

Table 2 presents the calculation results for verification of statistical hypotheses.

Table 2. Data for verification of statistical hypotheses: are there significant differences of student preferences in both countries, Poland and Ukraine

№	Indicator	Poland	Ukraine
1	the size of a sample, n	355	386
2	the expected value, $\dot{X}$	0,88	0,69
3	$\| \dot{X}_1 - \dot{X}_2 \|$	0,19	
4	$\mu_1 - \mu_2$	0,00	
5	the standard deviation for the sample, δ_x	0,32	0,46
6	average error, $\dot{S}_X = \delta_x / \sqrt{n}$	0,017	0,023
7	$\dot{S}^2$	0,00029	0,00053
8	$\dot{S}_1^2 - \dot{S}_2^2$	0,00024	
9	$\sqrt{(\dot{S}_1^2 - \dot{S}_2^2)}$	0,0155	
10	$\| z_{stat} \|$	12,258	
11	the value z_{tabl} for the level of significance 99,0	2,58	
12	Result, $\| t_{stat} \| > t_{tabl}$	Yes	
13	Accepted hypothesis is	Alternative	

Table 2 shows that | zstat | = 12,258 is more than ztabl = 2,58, then we reject the Research Hypothesis and accept the Alternative Hypothesis: there are statistically significant differences of student preferences in both countries, Poland and Ukraine, if one does not take into account random deviations.

The observed difference between two mathematical expectations cannot be explain by coincidence only. Since the difference exceeds a simple coincidence, student preferences in Poland and Ukraine are different, if random deviations will not to take into account.

It was statistically proved that educational preferences of Polish and Ukrainian students at lectures are not equal. This refers to the preference for the visual teaching methods at lectures.

The result is highly statistically significant (0,01). The Alternative hypothesis is accepted. This result is stronger than the result when the Research hypothesis is accepted [15-16].

5. Discussion

The study allowed to compare the preferences of students in Poland and Ukraine at lectures:
- Fig. 1 and Fig. 2 show that students of both countries prefer visual teaching methods at lectures.
- Verification of statistical hypothesis give provide that the educational preferences of Polish and Ukrainian students at lectures are not equal.

- Polish student preferences related the visual teaching methods at lectures are higher than Ukrainian ones.
- This difference of student preferences should be taken into account when Polish Universities enter the Ukrainian market of educational services. This recommendation is very important for Polish Universities in order to start selling educational services in Ukraine.

Can we trust the results of our research?

The results are highly statistically significant (0,01). That is why our results suggest that, the decision will be correct in approximately 99,0% of the cases and incorrect in 1,0% of cases only. In this sense, we have the decision-making process with accurate, controlled probability. We proved the results statistically by accepting Alternative hypotheses. This is a very strong basis for proof.

The study surveyed 741 respondents. There is a lot of evidence that the authors of the articles provided evidence based on a smaller number of respondents. This includes articles published in reputable journals [6, 19, 20]. The study used methods that were adequate for the purpose of the study. Also, the results of the experiment do not contradict the results published earlier [13, 14]. Therefore, we can be sure that our results are reliable. And we can trust the results.

6. Conclusions

The research goal has been achieved. The authors organized a large-scale study and compared the educational preferences of students in Poland and Ukraine at lectures. The results are of scientific and practical significance. In the scientific direction, the values of preferences of Polish and Ukrainian students at lectures were found. In the practical part this was shown as a direction for the authorities of Polish Universities in order to start selling educational services in Ukraine.

For the first time educational preferences of Polish and Ukrainian students at lectures were explored in this large-scale study:
1. It was shown that students of both countries prefer visual teaching methods at lectures.
2. It has been proven that the educational preferences of Polish and Ukrainian students at lectures are not equal. Polish student preferences related the visual teaching methods at lectures are higher than Ukrainian ones.
3. Authorities Polish Universities should take into account the difference of Polish and Ukrainian student preferences in order to start selling educational services in Ukraine. This recommendation is very important.
4. The results are highly statistically significant (0,01). In this sense, we have the decision-making process with accurate, controlled probability. We proved the

results statistically by accepting Alternative hypotheses. This is a very strong basis for proof.

5. The next aim is to organize new large-scale study and compare of student preferences in other East European countries.

Acknowledgements

Appendix 1

Characteristics of the respondents

№	Specialty	Number, n	Forms of study	University
1	2	3	4	5
1. Poland				
1	Economics, 1 degree, 3 year	13	full-time	University of Environmental and Life Sciences, Wroclaw
2	Biology, 1 degree, 3 year	10	full-time	
3	Social economy, 1 degree, 2 year	12	full-time	Pedagogical University, Kraków
4	Administration, 2 degree, 1 year	102	part-time	
5	Administration, 2 degree, 2 year	25	full-time	
6	Administration (business-administration), 2 degree, 1 year	22	full-time	
7	Law, 1 degree, 4 year	43	full-time	
8	Management, 1 degree, 2 year	17	full-time	University of Technology, Koszalin
9	Economics, 1 degree, 2 year	16	full-time	
10	Tourism and Recreation, 1 degree, 3 year	20	full-time	
11	Finance and Accounting	17	full-time	
12	Finance and Accounting, 1 degree, 3 year	29	full-time	Kraków University of Economics
13	Management in public health, 2 degree, 1 year	29	full-time	Technical University in Czestochowa
	Total respondents:	355	-	
2. Ukraine				
14	Pedagogy, 1 degree, 1-3 years	16	full-time	Wolodymyr Dahl East Ukrainian National University
15	Law, 1 degree, 2-4 years	25	full-time	
16	Law, 2 degree, 1-2 years	15	full-time	
17	Social work, 1 degree, 1-3 years	15	full-time	Luhansk Taras Shevchenko National University
18	Pharmacy, 1 degree, 2 year	30	full-time	Rivne Medical Academy
19	Computer science and information technology, 1 degree, 2 year	159	full-time	National Technical University of Ukraine "KPI of Igor Sikorsky"
20	Electromechanics, 1 degree, 3 year	15	full-time	Kharkiv National University of Urban Economy of A.N. Beketova
21	Medical business, 1 degree, 5 year	27	full-time	Vinnytsia National Medical University of N. I. Pirogova
22	Medical business, 1 degree, 2-3 years	38	full-time	Luhansk State Medical University
23	International economic relations, 1 degree, 4 year	14	full-time	Dnipro National University of O. Gonchar
24	International economic relations, 2 degree, 1 year	15	full-time	
25	Law, 1 degree, 2-3 years	17	full-time	M. Ostrohradskyi Kremenchuk National University
	Total respondents:	386	-	-
	Total number of respondents:	741	-	-

Appendix 2

Characteristics of the respondents' answers

No of group	response 1	response 2	response 3
Poland			
1	12	1	0
2	10	0	0
3	9	3	0
4	97	2	3
5	25	0	0
6	22	0	0
7	43	0	0
8	13	2	2
9	15	1	0
10	15	5	0
11	15	2	0
12	15	10	4
13	22	7	0
∑	313	33	9
Sum	313	42	
Ukraine			
14	10	0	6
15	11	11	3
16	8	2	5
17	3	10	2
18	19	10	1
19	119	36	4
20	10	5	0
21	22	2	3
22	31	6	1
23	11	3	0
24	10	3	2
25	13	4	0
∑	267	92	27
Sum	267	119	

Note: the line "Sum" indicates the total number of students who prefer visual and auditory teaching methods at lectures.

REFERENCES

[1] L. Bunce, A. Baird, S. E. Jones. The student-as-consumer approach in higher education and its effects on academic performance. Studies in Higher Education, 42:11, 1958-1978, 2017.

[2] L. Abdrakhmanova. The global market for educational services and the participation of Russia in it. Kazan: Kazan (Volga Region) Federal University, 2017.

[3] V. Okulich-Kazarin, et al. Three Characteristic Features of the East European Educational Services Market. Universal Journal of Educational Research, 8(4), 1549 - 1556, 2020.

[4] J. Carnevale. Auditory Learners: Online available from https://study.com/academy/lesson/auditory-learners-definit ion-characteristics.html (03 May 2018).

[5] V. Okulich-Kazarin. What Method of Learning do Media Students Prefer at Lectures: Auditory or Visual? Universal Journal of Educational Research, 8(6), 2660 - 2667, 2020.

[6] Fil. Kayalar, Fet. Kayalar. The effects of Auditory Learning Strategy on Learning Skills of Language Learners (Students' Views). IOSR Journal Of Humanities And Social Science (IOSR-JHSS), Volume 22, Issue 10, Ver. VII, 04-10, 2017.

[7] J. Raiyn. The Role of Visual Learning in Improving Students' High-Order Thinking Skills, Journal of Education and Practice, 7, 24, 115 - 121, 2016.

[8] S. I. Belentsov, A.V. Fahrutdinova, G.Y. Grevtseva, et al. Free education: Fundamentals of humanistic pedagogics (on the example of activity of the German public figures of the second half of XIX - the beginning of the XX centuries of F. Gansberg, L. Gurlitt, G. Sharrelman). European Journal of Contemporary Education, 8(1): 201-207, 2019.

[9] Y. M. Dora, K. Kaniawati, N. Nurani. Service Quality, Student Satisfaction and Decision in Remaining Active to Study - Study at Private Universities in West Java. Universal Journal of Educational Research, 7(5A), 18-23, 2019.

[10] D. Ö. Herdem. The Effect of Psychological Capital on Motivation for Individual Instrument: A Study on University Students, Universal Journal of Educational Research 7(6): 1402-1413, 2019.

[11] J. A. Douglas, A. Douglas, R. J. McClelland, et al. Understanding student satisfaction and dissatisfaction: an interpretive study in the UK higher education context, Studies in Higher Education, 40:2, 329-349, 2015.

[12] R. Maxwell-Stuart, B. Taheri, A. S. Paterson, et al. Working together to increase student satisfaction: exploring the effects of mode of study and fee status, Studies in Higher Education, 43:8, 1392-1404, 2018.

[13] V. Okulich-Kazarin, M. Zhurba, O. Pagava, et al. Lecture method preferences, auditory or visual, of Ukrainian consumers of educational services: a statistical analysis, International Journal of Education and Practice, Vol. 7, No.2, 54-65, 2019.

[14] V. Okulich-Kazarin, M. Zhurba, Y. Bokhonkova, et al. Three Scientific Facts about Ukrainian and Polish Law-students: Verification of statistical hypotheses about their Preferences of Learning at Lectures. European Journal of Contemporary Education, 8(3), 562-573, 2019.

[15] A. I. Kravchenko. Sociologia: textbook for students. - M., Yurayt, 2014.

[16] E. K. Vasileva, V. S. Lyalin. Statistika: textbook for students. - M., Yuniti-Dana, 2012.

[17] Textbook for the Program "Masters of Business Administration". BUS_9641_Business_Statistics_3, USA, NY, Kingston University, 2009.

[18] Textbook for the Program "Masters of Business Administration". BUS_9641_5M. Business_Statistics. USA, NY, Kingston University, 2010.

[19] C. Özdemir, E. D. Özdemir. Suggestions for Problems Faced in Basic Language Skills by University Students Learning Turkish in Kazakhstan. European Journal of Contemporary Education, 7(2), 344 - 359, 2018.

[20] A. Pavlova. Gendernaya asimmetria v oboznacheniykh socialnykh roley v russkom yazike v aspekte vospriyatiya. Przegląd Wschodnioeuropejski, VII/2, 211-221, 2016.